



Service Data

SD-03-3656

Bendix® TP-3DC™ Tractor Protection Valve with Double Check

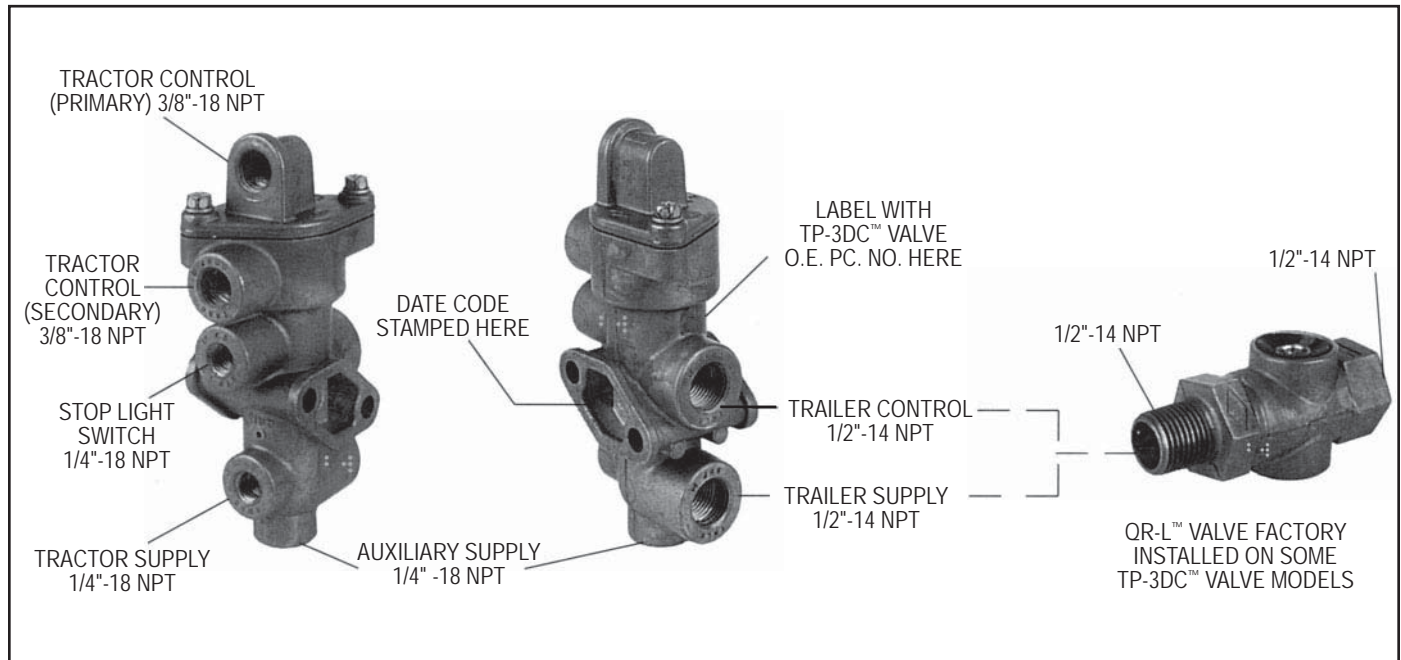


FIGURE 1 - TP-3DC™ TRACTOR PROTECTION VALVE WITH DOUBLE CHECK

DESCRIPTION

The tractor protection valve system protects tractor air brakes during trailer breakaway and/or when severe air leakage develops in the tractor or trailer. This function is required by law.

In normal use the tractor protection valve is used to shut off the trailer control line before disconnecting the tractor from the trailer. It is usually mounted at the rear of the tractor cab, and it is used in conjunction with a dash-mounted control valve.

The TP-3DC™ valve integrates tractor protection and double check valve functions. It also has an integral single check valve that prevents trapping of air in the trailer control line. This prevents service and spring brake compounding, and it avoids a trailer roll away situation if the trailer is parked with the air applied.

A stoplight switch port allows direct stoplight installation, and the auxiliary supply port, when connected to the BP-R1™ control port, eliminates a tee in the tractor supply line. Also, a QR-L™ valve can be factory installed in the trailer control and/or supply port to meet timing requirements.

Port

| Port | Embossed I.D. | Thread Size |
|-----------------------------|---------------|-------------|
| Tractor Supply | TRAC SUP | 1/4"-18 NPT |
| Auxiliary Supply | AUX SUP | 1/4"-18 NPT |
| Tractor Control (Primary) | TRACT CONT | 3/8"-18 NPT |
| Tractor Control (Secondary) | TRAC CONT | 3/8"-18 NPT |
| Stop Light Switch | STP LT SW | 1/4"-18 NPT |
| Trailer Supply | TRLR SUP | 1/2"-14 NPT |
| Trailer Control | TRLR CNTL | 1/2"-14 NPT |

Weight: 1.5 lbs.

Material: Die-cast aluminum

Operating pressure: 150 psi maximum

Operating temperature: -40° to 200° F

Figure 1 shows the TP-3DC™ valve with its port designations, O.E. piece number, and date code identifications.

Figure 2 is a sectional view of the TP-3DC™ valve, and Figure 3 presents the TP-3DC™ valve in a partial air brake system schematic.

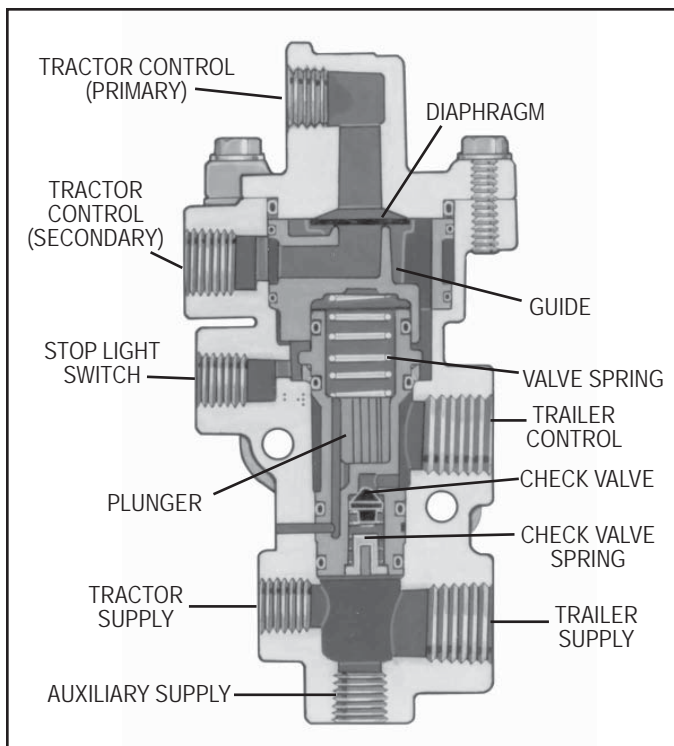


FIGURE 2 - TP-3DC™ TRACTOR PROTECTION VALVE WITH DOUBLE CHECK SECTIONAL VIEW

OPERATION

INITIAL CHARGE

As shown in Figure 4, during initial charge air pressure enters the TP-3DC™ tractor supply port (TRAC SUP). In addition to passing through the TP-3DC™ valve to and out the trailer and auxiliary supply lines, supply air moves the plunger, against valve spring pressure, into contact with the guide. With approximately 45 psi at the tractor supply port, the inlet valve opens. The TP-3DC™ valve is now in the normal "run" mode, ready to receive and deliver a service brake application from the foot valve or hand valve.

SERVICE BRAKE APPLICATION

Figure 5 shows a normal service brake application. Supply air holds the valve open, and the TP-3DC™ valve receives service air from the primary and secondary service circuits on the tractor. The greater pressure of the two (the secondary service circuit double check valve delivers the greater of foot valve secondary delivery and trailer hand control valve delivery) will cause the TP-3DC™ valve's internal check valve diaphragm to seal the port with the lower pressure. The higher pressure will then flow out the open inlet to the trailer control line. Figure 5 shows an application with primary service air as the greater pressure. Note that service air pressure also activates the stop light switch, and it flows to the single check valve. However, with supply pressure acting on the opposite side of the single check valve, the valve remains closed.

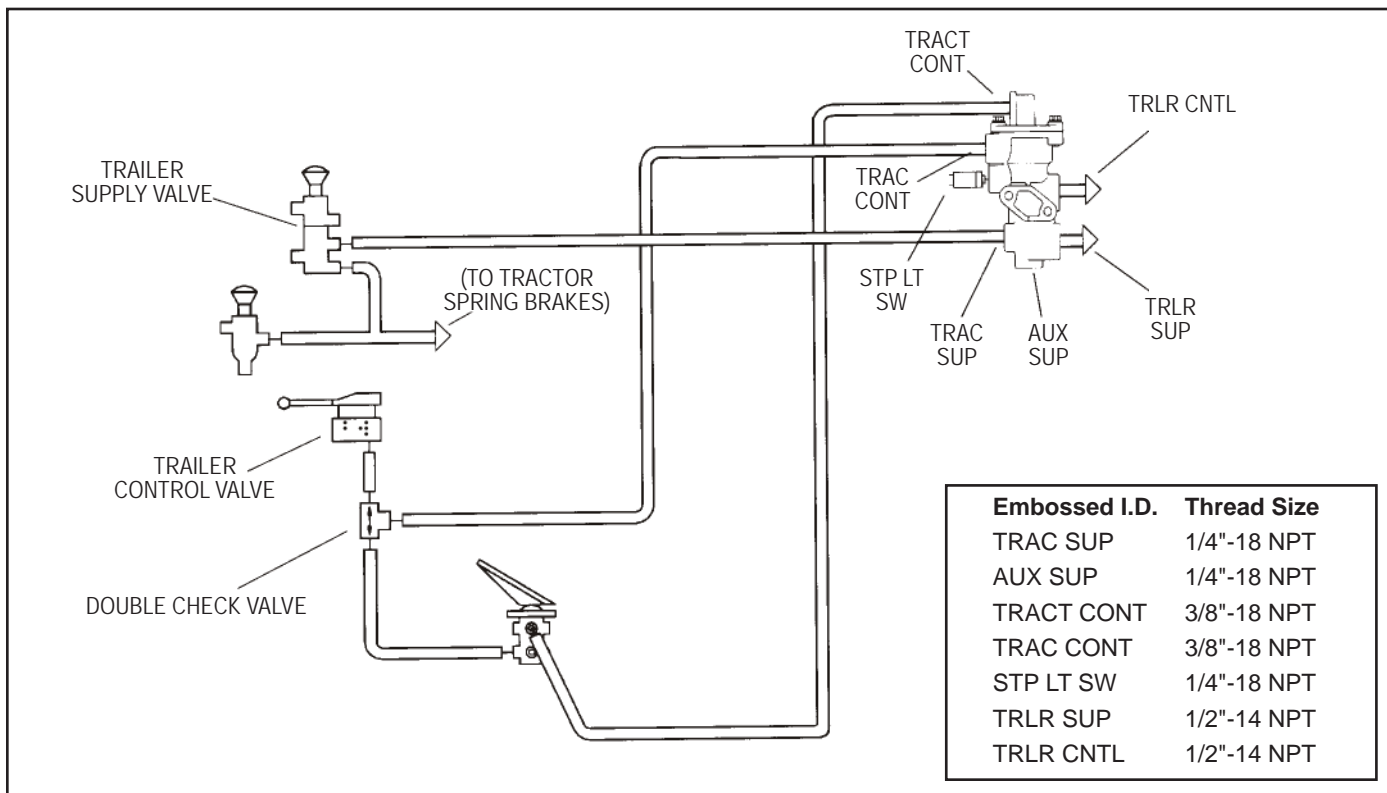


FIGURE 3 - PARTIAL AIR BRAKE SYSTEM SCHEMATIC WITH TP-3DC™ TRACTOR PROTECTION VALVE WITH DOUBLE CHECK

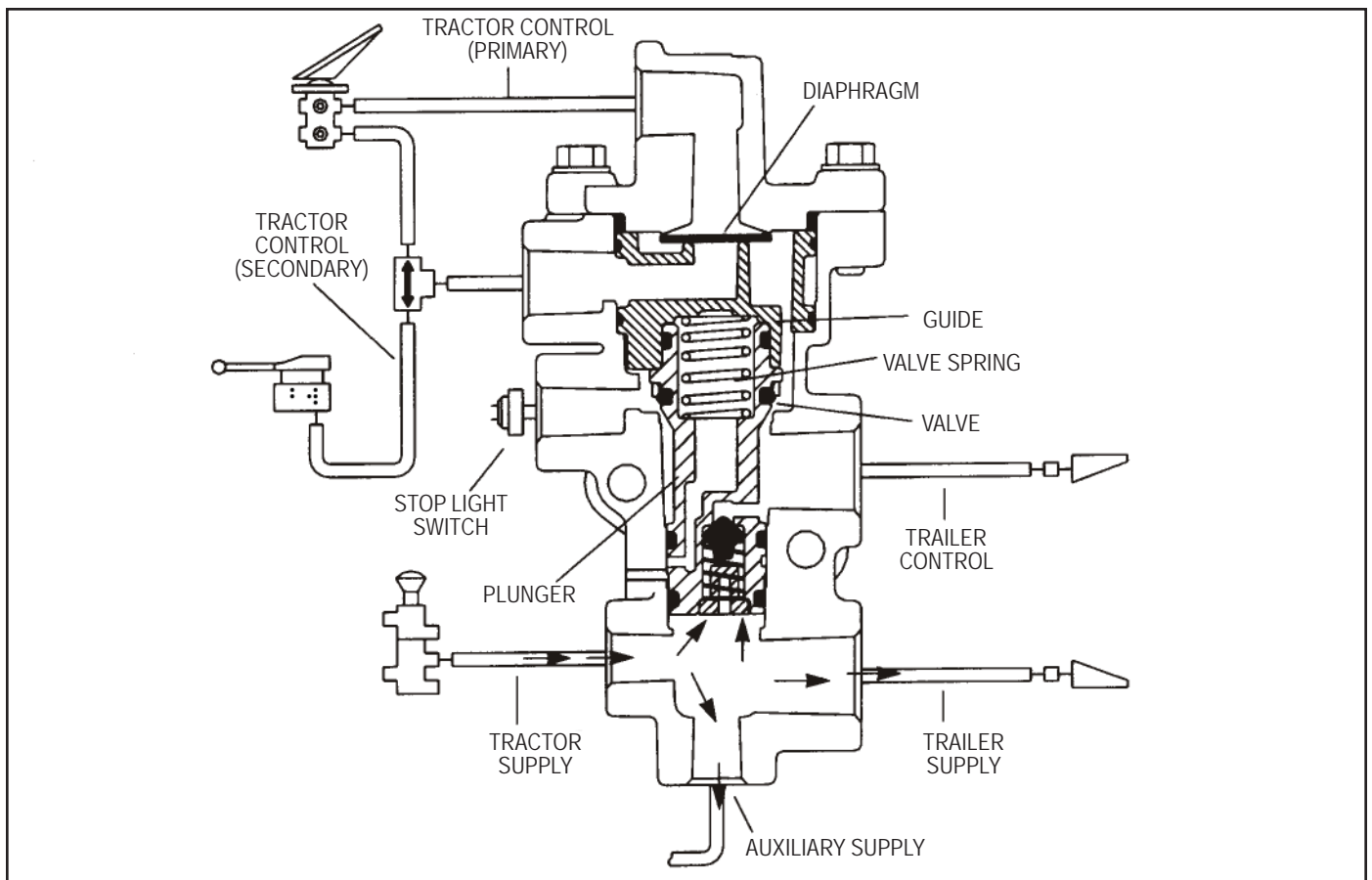


FIGURE 4 - INITIAL CHARGE

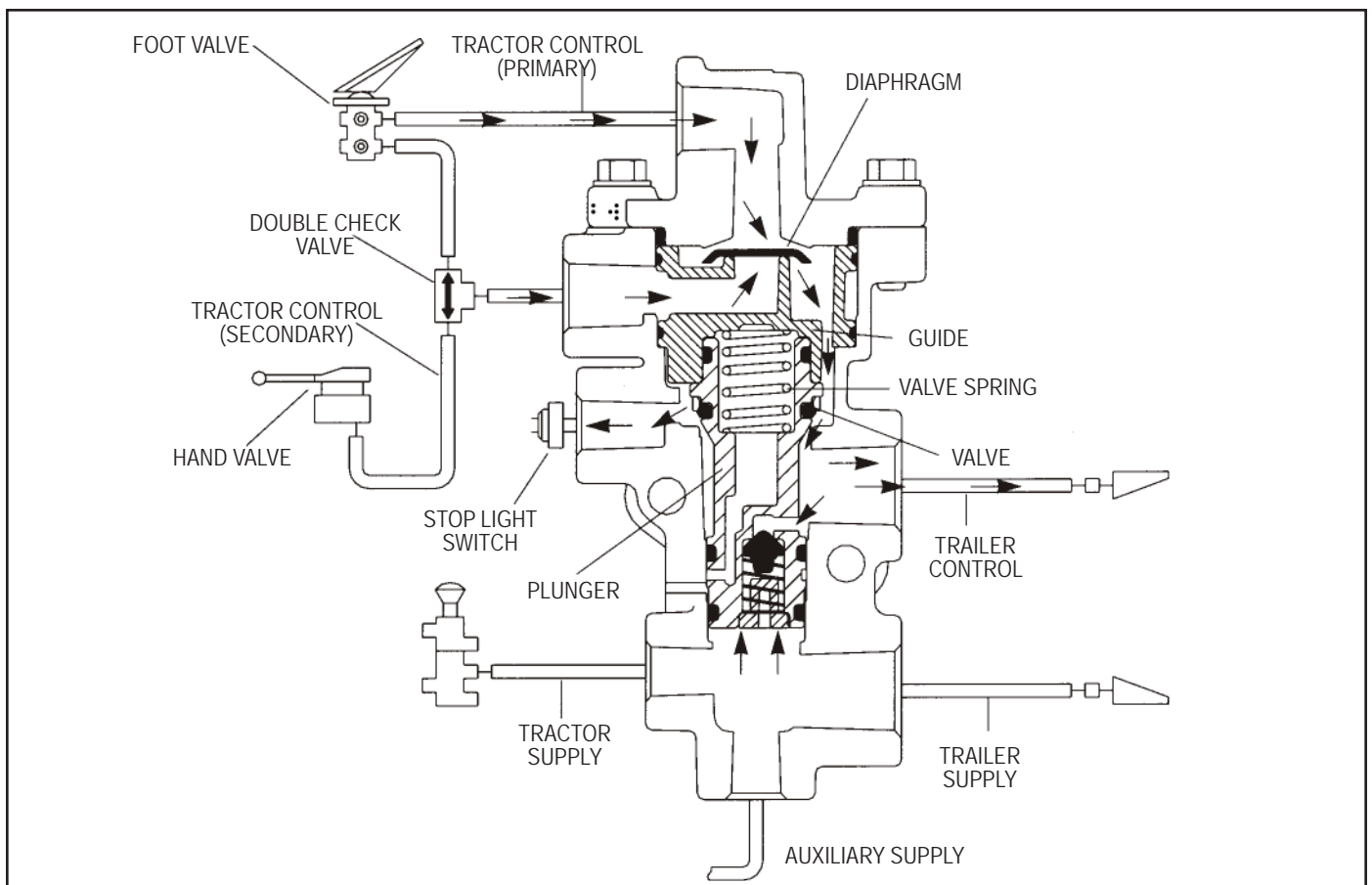


FIGURE 5 - SERVICE BRAKE APPLICATION

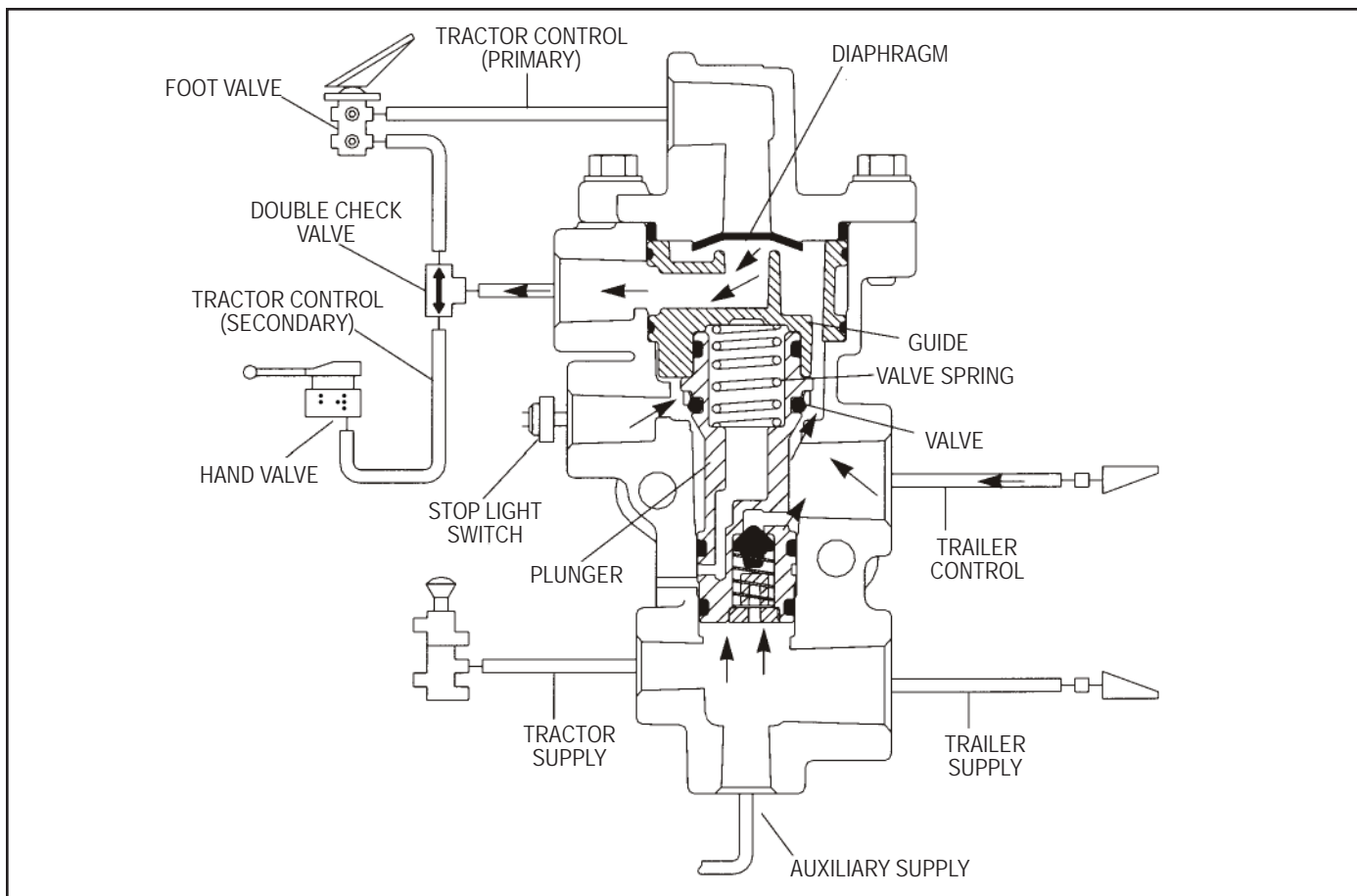


FIGURE 6 - SERVICE BRAKE RELEASE

SERVICE BRAKE RELEASE

As shown in Figure 6, when a service brake application is released, air from the trailer control line returns to the trailer control port of the TP-3DC™ valve and passes back through the open inlet. It then forces the diaphragm to move against its seat in the cover and flows out the tractor control (secondary) port to be exhausted at either the foot valve or the hand control valve.

TRACTOR PROTECTION

Figure 7 shows the tractor protection function of the TP-3DC™ valve. When the trailer supply valve is pulled out, or if trailer supply line air pressure decreases to approximately 20-30 psi, the valve spring forces the plunger down and closes the inlet valve. Service air from the tractor can no longer pass through the valve to the trailer.

ANTI-COMPOUNDING

The TP-3DC™ valve has an internal single check valve that prevents simultaneous spring brake and service brake applications on the trailer. As shown in Figure 8, if a service application is being made, and then the trailer supply valve is pulled out to apply the trailer spring brakes, service air passes back through the single check valve and exhausts at the trailer supply valve. Future compounding is prevented by the closed inlet valve.

WARNING! PLEASE READ AND FOLLOW THESE INSTRUCTIONS TO AVOID PERSONAL INJURY OR DEATH:

When working on or around a vehicle, the following general precautions should be observed at all times.

1. Park the vehicle on a level surface, apply the parking brakes, and always block the wheels. Always wear safety glasses.
2. Stop the engine and remove ignition key when working under or around the vehicle. When working in the engine compartment, the engine should be shut off and the ignition key should be removed. Where circumstances require that the engine be in operation, **EXTREME CAUTION** should be used to prevent personal injury resulting from contact with moving, rotating, leaking, heated or electrically charged components.
3. Do not attempt to install, remove, disassemble or assemble a component until you have read and thoroughly understand the recommended procedures. Use only the proper tools and observe all precautions pertaining to use of those tools.

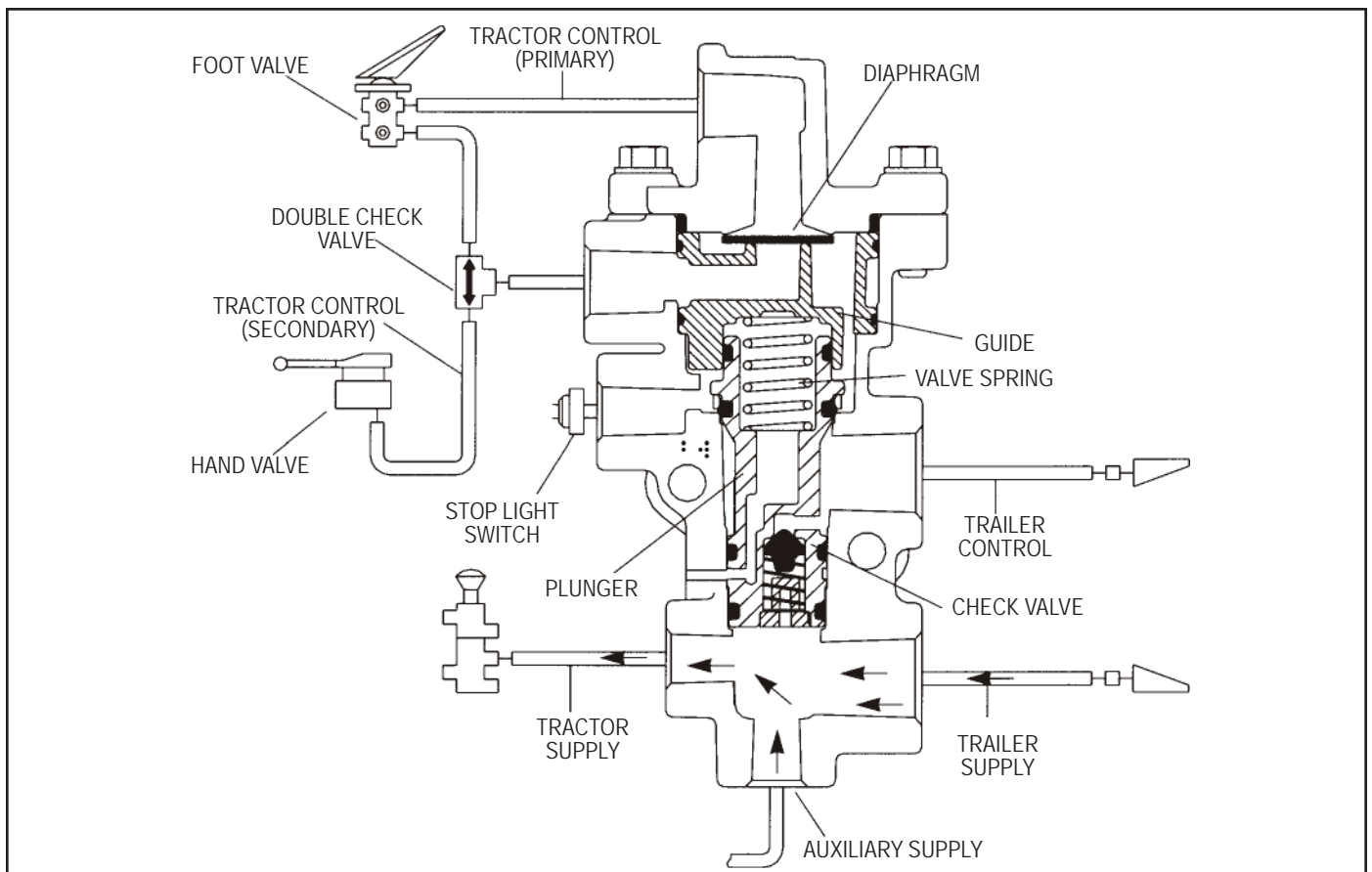


FIGURE 7 - TRACTOR PROTECTION

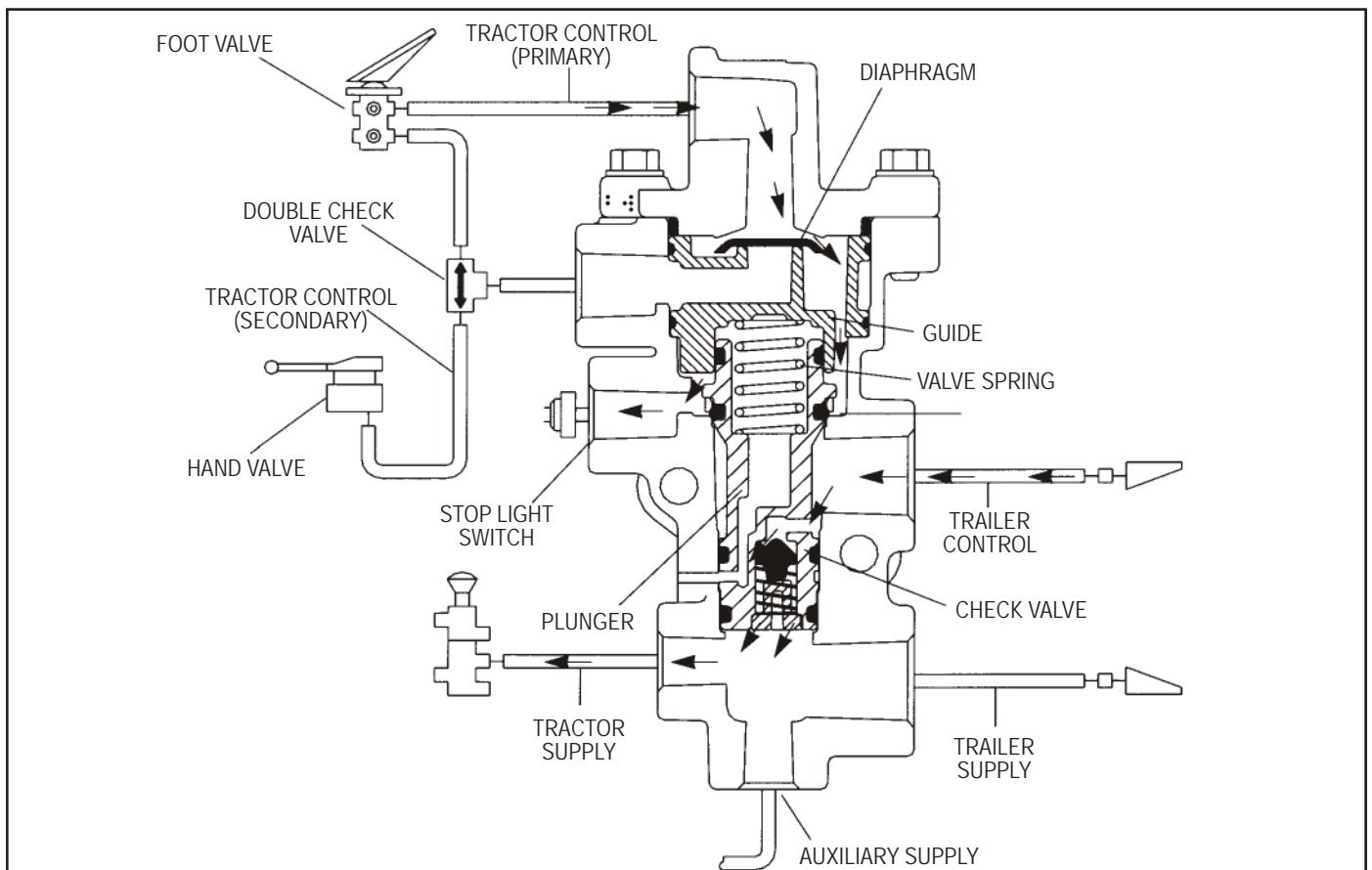


FIGURE 8 - ANTI-COMPOUNDING

4. If the work is being performed on the vehicle's air brake system, or any auxiliary pressurized air systems, make certain to drain the air pressure from all reservoirs before beginning **ANY** work on the vehicle. If the vehicle is equipped with an AD-IS® air dryer system or a dryer reservoir module, be sure to drain the purge reservoir.
5. Following the vehicle manufacturer's recommended procedures, deactivate the electrical system in a manner that safely removes all electrical power from the vehicle.
6. Never exceed manufacturer's recommended pressures.
7. Never connect or disconnect a hose or line containing pressure; it may whip. Never remove a component or plug unless you are certain all system pressure has been depleted.
8. Use only genuine Bendix® replacement parts, components and kits. Replacement hardware, tubing, hose, fittings, etc. must be of equivalent size, type and strength as original equipment and be designed specifically for such applications and systems.
9. Components with stripped threads or damaged parts should be replaced rather than repaired. Do not attempt repairs requiring machining or welding unless specifically stated and approved by the vehicle and component manufacturer.
10. Prior to returning the vehicle to service, make certain all components and systems are restored to their proper operating condition.
11. For vehicles with Antilock Traction Control (ATC), the ATC function must be disabled (ATC indicator lamp should be ON) prior to performing any vehicle maintenance where one or more wheels on a drive axle are lifted off the ground and moving.

PREVENTIVE MAINTENANCE

Important: Review the Bendix Warranty Policy before performing any intrusive maintenance procedures. A warranty may be voided if intrusive maintenance is performed during the warranty period.

No two vehicles operate under identical conditions; as a result, maintenance intervals may vary. Experience is a valuable guide in determining the best maintenance interval for air brake system components. At a minimum, the TP-3DC™ valve should be inspected every 6 months or 1500 operating hours, whichever comes first, for proper operation. Should the TP-3DC™ valve not meet the elements of the operational tests noted in this document, further investigation and service of the valve may be required.

SERVICE CHECKS

1. Remove any accumulated contaminants. Visually inspect the valves exterior for cracks, gouges, or other physical damage. Replace the valve if physical damage is excessive.

2. Inspect all air lines connected to the valve for signs of wear or physical damage. Repair/replace as necessary.
3. Test air line fittings for excessive leakage and tighten or replace as necessary.

OPERATIONAL AND LEAKAGE TESTS

1. Block the vehicles wheels and fully charge the air system.
2. Place the trailer supply valve in the emergency position.
3. Disconnect the trailer control line hose coupling. Then make a service application with either the foot valve or the trailer control valve and check for leakage at the hose coupling with a soap solution. Leakage should not exceed a 1" bubble in 5 seconds (100 SCCM).
4. Release the service application and place the trailer supply valve in the normal or run position. Connect the trailer control valve to a test gauge.
5. Make a service brake application and note that service air pressure is present at the trailer control line hose coupling.
6. With the ignition on, make and hold a service brake application and note that the stop lights function.
7. Remove the line at the TP-3DC™ valve primary tractor control port (TRAC CONT) and plug the end of the line. Then make a service brake application and check for leakage at the open tractor control port. Leakage should not exceed a 1" bubble in 5 seconds (100 SCCM).
8. Reconnect the line to the primary tractor control port, then disconnect and plug the line at the secondary tractor control port (TRACT CONT). Then make a service brake application and check for leakage at the open tractor control port. Leakage should not exceed a 1" bubble in 5 seconds (100 SCCM).

If the valve does not function as described; or if leakage is excessive, repair the valve or replace it at any authorized parts outlet.

REMOVAL

1. Identify and mark or label all air lines and their connections to the TP-3DC™ valve. Then disconnect the air lines.
2. Remove the TP-3DC™ valve from the vehicle. Retain the mounting hardware.

INSTALLATION

1. Install the TP-3DC™ valve on the vehicle using the mounting hardware saved during removal.
2. Reconnect all air lines to the valve using the identification made during removal.
3. Test all air fittings for excessive leakage and tighten as needed. Also, perform OPERATIONAL AND LEAKAGE TESTS before placing the vehicle back into service.

DISASSEMBLY

The following disassembly and assembly procedures are for reference only. Always have the appropriate maintenance kit on hand, and use its instructions in lieu of those presented here. Refer to Figure 9 throughout the procedures.

1. Remove the two 1/4" hex/torx head screws that secure the cover to the body.
2. Remove and discard o-ring(1) from the cover.
3. Remove and discard diaphragm(2).
4. Remove the guide, and remove and discard o-rings (3 & 4) from the guide.
5. Remove the valve spring from the plunger, then remove the plunger.
6. Remove and discard o-ring(5) from the plunger.
7. Remove and discard collar(6) and o-ring(7) from the plunger.
8. Remove and discard o-rings(8 & 9) from the plunger.

CLEANING AND INSPECTION

1. Clean all metal parts in mineral spirits and dry them completely.
2. Inspect all parts for excessive wear or deterioration. Inspect valve seats for nicks or burrs. Check the valve spring for cracks or corrosion.
3. Inspect the bores of the valve housing for deep scuffing or gouges.

Replace all parts that were discarded and any parts not found to be serviceable during inspection, using only genuine Bendix replacement parts.

ASSEMBLY

Before assembling the TP-3DC™ valve, lubricate all o-rings, o-ring grooves, body bores and rubbing surfaces with Bendix silicone lubricant (Pc. No. 291126) or equivalent.

NOTE: When using pipe thread sealant during assembly and installation, take particular care to prevent the sealant from entering the valve itself. Apply the sealant beginning with the second thread back from the end.

1. Install o-rings(8 & 9) onto plunger.
2. Install o-ring(7) onto plunger and then install collar(6) over o-ring(7). Make sure the collar is fully seated and firmly in place.

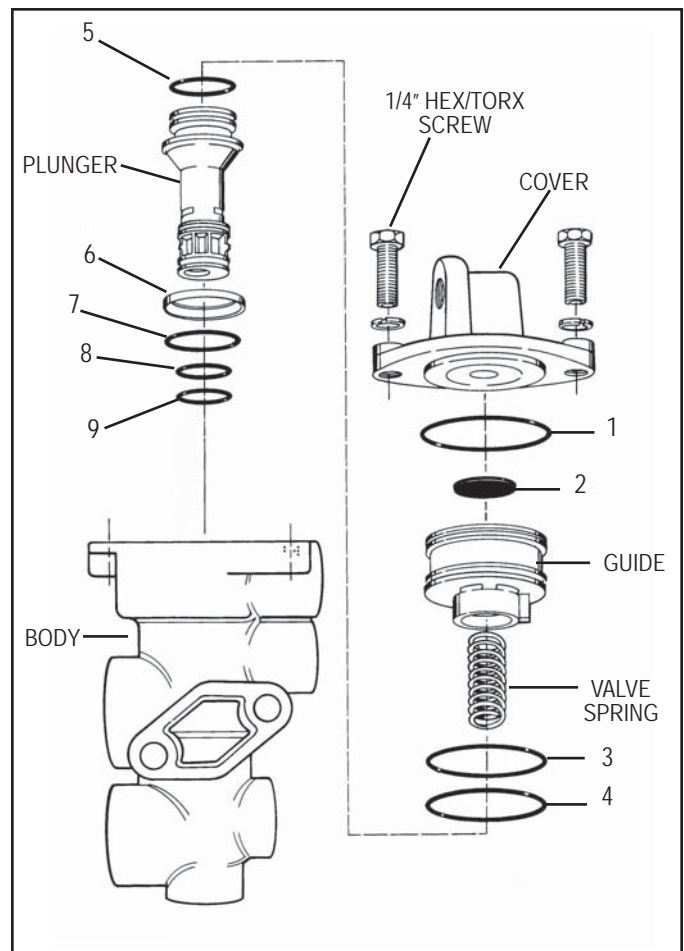


FIGURE 9 - TP-3DC™ VALVE EXPLODED VIEW

3. Install the plunger in the body. Then install the valve spring into the plunger.
4. Install o-rings(3 & 4) onto the guide.
5. Properly align the guide by orienting its indexing tab with the corresponding notch in the body, then install the guide in the body.
6. Place diaphragm(2) onto the guide.
7. Install o-ring(1) onto the cover.
8. Firmly press the guide against spring pressure and install the cover on the body. Secure with the two hex/torx head screws. Torque to 30 - 60 in. lbs.

NOTE: BEFORE PLACING THE VEHICLE BACK INTO SERVICE, PERFORM OPERATIONAL AND LEAKAGE TESTS.

